

(12) INTERNATIONAL PUBLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
10 September 2004 (10.09.2004)

PCT

(10) International Publication Number  
WO 2004/077003 A1

(51) International Patent Classification<sup>7</sup>: G01L 1/12,  
G01N 27/72, G01R 33/12

THAYER, Peter, John [GB/GB]; 49 Hill View Road, Oxford, Oxfordshire OX2 0DA (GB).

(21) International Application Number:  
PCT/GB2004/000556

(74) Agents: MANSFIELD, Peter, Turquand et al.; Accentus plc, Patents Dept., 329 Harwell, Didcot, Oxfordshire OX11 0QJ (GB).

(22) International Filing Date: 13 February 2004 (13.02.2004)

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
0304192.8 25 February 2003 (25.02.2003) GB

(71) Applicant (for all designated States except US): AEA TECHNOLOGY PLC [GB/GB]; 329 Harwell, Didcot, Oxfordshire OX11 0QJ (GB).

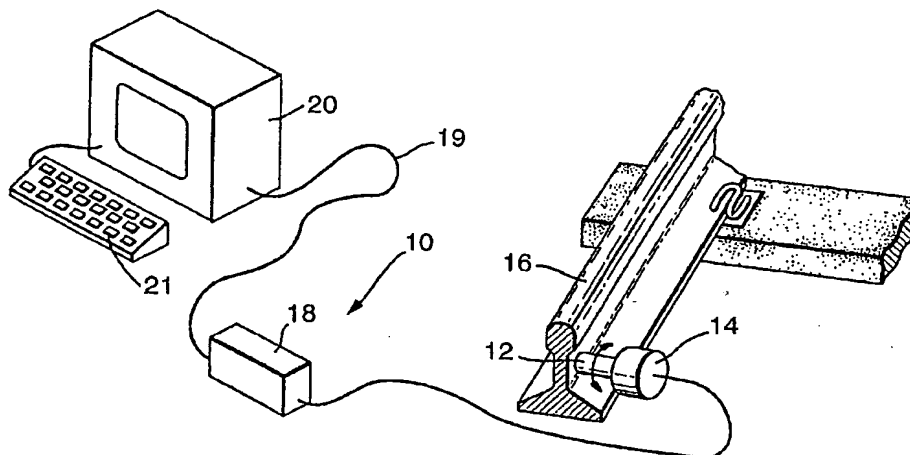
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SI, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NI, SN, TD, TG).

(72) Inventors; and

(75) Inventors/Applicants (for US only): BUTTLE, David, John [GB/GB]; 29 Upthorpe Drive, Wantage, Oxfordshire OX12 7DF (GB). DALZIEL, William [GB/GB]; 21 St. Catherine's Road, Winchester, Hampshire SO23 0PP (GB).

[Continued on next page]

(54) Title: MEASUREMENT OF RESIDUAL AND THERMALLY-INDUCED STRESS IN A RAIL



(57) Abstract: In a railway line, thermally-induced stresses are a factor for both rail breaks and rail buckling. These stresses are in the longitudinal direction. A nondestructive measuring technique enables the residual stress in a rail to be determined, and hence the thermally-induced stress. An electromagnetic probe is used to measure the stresses in the rail web in the vertical direction, and in the direction parallel to the longitudinal axis. The residual stress in the longitudinal direction can be deduced from the measured stress in the vertical direction; hence the thermally-induced stress can be determined.

WO 2004/077003 A1



**Declarations under Rule 4.17:**

- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT,

LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)

- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for all designations
- as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for the following designation US
- of inventorship (Rule 4.17(iv)) for US only

**Published:**

- with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.